Poster

PHOTOLUMINESCENCE STUDIES ON LANTHANIDES DOPED ZNO.

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Wurtzite ZnO is one of the most researched materials for optoelectronic and spintronic applications, due to its wide band gap, high transparency over the whole visible spectrum and is one of the semiconductors with largest piezoelectric coefficients. Lanthanide doped ZnO has a great potential for the development of light emitting devices in visible and infrared due to its very sharp and intense emissions in this regions.

In this work we analyzed intentionally rare earth doped bulk ZnO and surface modified ZnO nanocrystals using ion implantation and *in*-situ doping techniques. The incorporation of Terbium, Europium, Praseodymium, Thulium and Erbium was analysed using optical and structural techniques. We report on the different intraionic transitions of these ions, observed by photoluminescence (PL) and photoluminescence excitation (PLE). Temperature dependence studies allow us to develop models for the recombination of the optical active centres.

Structural complementary techniques such as X-ray diffraction (XRD), Rutherford backscattering spectrometry (RBS) and channelling (RBS/C) were used in order to achieve an in-depth knowledge of the samples quality, damage recovery and ion site location.

References:

A S Pereira, M Peres, M J Soares, E Alves, A. Neves, T Monteiro, T Trindade, Nanotechnology 17, 2006, 834-839

E. Rita, E. Alves, U. Wahl, J.G. Correia, T. Monteiro, M.J. Soares, A. Neves, M. Peres, Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms, Volume 242, Issues 1-2, January 2006, Pages 580-584

Figures:

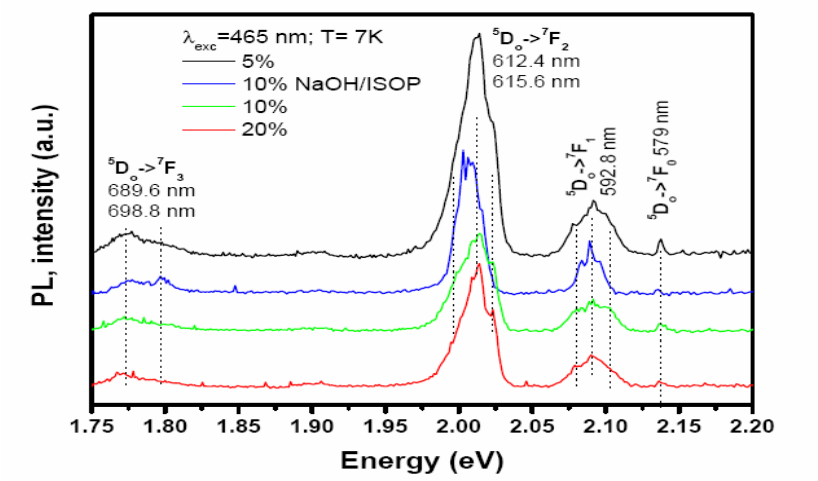

Fig1: Intraionic $5D_0 \rightarrow 5F_j$ transition of the Eu^{3+} in doped ZnO nanocrystals with different concentrations of Eu3+